E - EROSION CONTROL AND LANDSCAPING

Getting Started

Save all design files to the appropriate folder
- Save files mentioned in this Section to U:\rd\prj\COUNPCN#
- Refer to A - General for file naming conventions
- Create a project folder following naming conventions if one has not been created.

Create the "g file":
- Open MicroStation
- Click on New file (white sheet) at the top
- Select the correct project folder - U:\rd\prj\COUNPCN#
- Go to Browse at the bottom and select seed.dgn. This will create a 2-D file.
- Name the file gPCN#.dgn and Save
- Attach dPCN#?.dgn to the "g file" (See Reference Files below)

Use the "g file" for measuring and designing
- The "g file" is primarily used for calculating topsoil quantities and viewing contours during design.
- This file may also be used as an attachment in plan sheet files. Use as an attachment to:
  - Attain more accurate placement of symbology that crosses multiple plan sheets
  - Make designing easier. The whole project can be viewed instead of a single sheet.

Reference Files
Reference files can be viewed in MicroStation files by going to File>References
- Reference files can be attached/detached here
- Make sure to click on the correct file before selecting detach, if necessary.

Each plan sheet or title sheet copied has References attached to it. References may include:
- Grading Design Drafter's file dPCN#?.dgn
- Right of Way drafter's file rPCN#.dgn
- Topography file tPCN#?.dgn (located in the Region Design folder)
- Curb and Gutter file cgPCN#.dgn
- Border file plan.bdr
- Bridge/Structure file bPCN#.dgn
- Landscape Architect file gPCN#.dgn

See Plan Sheet preparation for properly attaching the "g file" to plan sheets

Levels
To turn Levels on/off go to Settings>Levels>Display and click on the levels under either the design file or reference files to turn them on/off.

Basics for Viewing MicroStation Graphics
- Click on the Fit View button at the top of the view window to view all graphics in the file.
- Click on the Pan View button at the top of the view window to drag the view around.
- Use the wheel on the mouse to zoom in and out.

Graphically Representing and Explaining the Design
Cells are used to keep plans consistent. There are two basic types of cells:
- Symbology—graphic representations of plants and erosion and sediment controls:
  - Can be placed in the "g file" which is later attached to plan sheets
  - OR can be placed directly in individual plan sheets
- Text—headings, indexes, legends, and install notes. Place text notes in plan sheets only.
- See Roadside Development Cells on E-4 for finding, placing, and modifying cells.

Save Settings
Go to File>Save Settings before exiting MicroStation files. This ensures that the appropriate levels remain turned off and the cell library remains attached. It also saves the last view of the file.

Measuring Topsoil Areas Using MicroStation

Open gPCN#.dgn
- Turn off all levels except for L2 of dPCN#r.dgn.

Load InRoads by pressing F1 key.
- InRoads go to File>Open> U:\rd\prj\COUNPCN#\PCN#.rwk and double click on it and hit Cancel
- Go to Surface>View Surface>Perimeter and select Surface: Mainline>Apply>Close
  - Only one surface can be viewed (placed) in the "g file" at a time, so repeat this process for all new surfaces by changing the Surface and clicking Apply for each new surface before hitting Close.
  - Other new surfaces include Diversions (div#), Intersecting Roads (xr#), and Frontage Roads(fr#) and Wetlands.
  - If there is more than one new surface, surfaces will likely overlap.
- Close InRoads and change the Active Level (under the menu title bar) to L1 in gPCN#.dgn
- Trim overlapping surfaces by pressing and holding the Modify – Main Task button and selecting IntelliTrim Operation: Trim and following the directions at the bottom of the View.
  - Determining the boundary between intersecting roads and the mainline:
    - Use Section B plan sheets as a guide: separate quantities out if the Section B has separate plan sheets for intersecting roads
    - The mainline ROW line could also act as the cutoff between alignments
  - If there are multiple project numbers, ask the Engineer the project boundaries
- Using the stations of the boundaries of each Section B plan sheet, copy tick marks and station increment numbers (placing numbers outside of the surface boundary). Increments are typically:
  - 30 station increments for Rural projects
  - 15 station increments for Suburban projects
  - 6 station increments for Urban projects
  - Or a combination of the above
- Turn off all levels except Level 1 and Level 32 of gPCN#.dgn
- Extend tick marks (using IntelliTrim Operation: Extend) to the surface boundary

For Rural Projects
- Click on the Measure – Main Task button hold and pull to select Measure Area>Method: Flood
- Click in each area between the tick marks to measure

For Urban Projects
- Measuring in urban areas requires attaching the topo file and curb and gutter file (and sometimes the r file) so that all areas to be seeded can be measured using MicroStation.
- Place SmartLines and make shapes for the areas to be seeded. The shapes need to be closed shapes (begin and end at the same point)
  - Use the Linear –Task click and pull to select Place Smartline
  - Make sure Segment Type is Lines, Vertex Type is Sharp, and Join Elements is checked.
- Measure Smartline shapes by left clicking and holding the Measure – Main Task button and selecting Measure Area, Method: Element

For ADA Projects
- Estimate a 3 foot disturbed area beyond curb ramps and sidewalks. Offset the curb ramps and sidewalk 3 feet so that an area can be measured.
  - To offset a line go to Manipulate – Main Task click and pull to select Move Parallel
  - Make sure Distance is checked and set to 3.
  - Click on the line to be offset (or moved parallel) and click on the side away from the pavement
- Place Smartlines to outline each area created by offsetting the edge of the ramp or sidewalk
  - See For Urban Projects above on creating SmartLine shapes and measuring them

For Suburban Sections select the most appropriate method from above.

Use Areas to Determine Topsoil Quantities Refer to the Water Quality Enhancement Program Manual

Measuring Seeded Areas Using MicroStation

Use the "g file" to measure areas using the same MicroStation tools used to measure topsoil areas
- The seeded area would be everything within the ROW (right-of-way) and Temporary Easements minus the roadway and other paved surfaces.
- Depending on the type of project, the following levels need to be on and the corresponding reference files need to be attached to measure the seeded areas:
  - L25 (the existing ROW line) and/or L27 (the new ROW line) of the r file
  - L13 (temporary easements) and L17 (approaches) of the d file
  - L19 (curb, gutter, driveways, curb ramps, and sidewalk) of the cg file
  - L11 (edge of existing pavement), L12 (edge of existing gravel surfacing), L15 (edge of existing sidewalk), and L52 (buildings) of the topo file

Displaying Contours in the "g file"

Contours are used as a design tool. While in gPCN#.dgn, press F1 for InRoads dialogue box then File>Open U:\rd\prj\COUNPCN#\PCN#.rwk (for grading projects) or locate the original contours in the associated region's project folder U:\rd\RegionXX\prj\COUNPCN#\PCN#org.dtm
- Go to Surface>View Surface>Contours>
  - Original contours PCN#org.dtm are best used to identify areas requiring perimeter controls that are placed prior to grading and outside work limits (aka cut/fill line)
  - Design contours—mainline.dtm, xr#.dtm, and fr#.dtm—are used to identify areas requiring final stabilization and should reflect the profile sheets and cross-sections.
- Preferences…Erosion Plans>Load>Close>Apply
- Contours can be merged under Surface>Edit Surface>Merge Surfaces and then viewed
- NEVER save changes when exiting InRoads

Roadside Development Cells

Placing Cells
- Cells are placed on Level 20 of the design file (make sure L20 is on)
- Click on the Cells - Task button, hold and pull to see menu and click on Place Active Cell
- If the name of the cell is known, enter it in the Active Cell box and hit enter
- If the name of the cell is not known, click on the magnifying glass to browse cells
  - When the Cell Library directory opens go to File>Attach File>rdev.cel
  - Scroll through the list to locate the cell needed and double click on it
- To place the cell left click where it is to be placed, then right click to reset

Modifying Cells
Editing Text Cells
- Click on the Text – task button, hold and pull to see menu and click on Edit Text
- Click on the note cell to be edited
- Edit the text in the box when it appears.
- When finished editing, click anywhere outside the box to save the changes or click the x in the upper right corner to exit without saving changes.
Manipulating Cells
- To Rotate, Scale, or Move cells
  - Click on Manipulate – Main Task button, hold and pull to see menu
  - Click on task to perform and follow instructions at the bottom of the screen

Updating the Roadside Development Cell Library (rdev.cel)
- Update cells in C:/DOT/rd/cell/rdev.cel before having them updated on the U:drive by the Computer Applications Engineer

Plan Sheet Preparation

Copy and Paste
- For Grading Projects, Copy and Paste all Plan Sheets prepared by Grading Squads (STA.dgn)
- For Surfacing Projects: Plan sheets are typically not created.
- For Region or Bridge Projects: Ask for a copy of their plan sheets if you cannot locate them in their project folders on the U drive (see Title Sheet Preparation for location of title/plan sheets)

Rename
- For Erosion Control Plans rename STA – Copy.dgn to follow naming convention (STAec.dgn)
- For Landscaping Plans rename STA – Copy.dgn to follow naming convention (STAla.dgn)

Procedure to Display "g file" in Plan Sheets, if neccesary
Open an Erosion and Sediment Control Plan sheet or a Landscaping Plan sheet
- File>Reference>Tools >Copy
- Make sure dPCN#?.dgn is selected
- Snap to lower left corner of red dashed border (name cell) of Erosion and Sediment Control plan sheet and accept; then snap to exact same spot again and accept again
- Double click on copy of dPCN#?.dgn in the reference dialogue box
- Change File Name to gPCN#.dgn and select "No Nesting" under "Nested Attachments" and OK

Place Cells
- Even if the "g file" is attached to each plan sheet, note cells need to be placed on each plan sheet
- If the "g file" was not used to place symbology cells, they need to be placed in each plan sheet
- Refer to Roadside Development Cells on E-4 for where to find and how to place and modify cells

Levels
The following is a list of some items we want to have shown on our Erosion Plan Sheets:
- Rivers, creeks, streams, wetlands and other waterways*
- Drainage arrows, pipes, and drop inlets.
- Box Culverts and Bridges
- Alignment and stationing*
- ROW lines and Temporary Easements
- Work Limits
- Trees, Buildings, and Rock Outcroppings
- Curb and Gutter*
- Decorative concrete*
- Plan Sheet Border with Project No.*
- Plus other items that affect erosion control
    *These items are also needed for Landscaping Plans.
Levels should be turned off as suggested below to clearly and accurately show erosion and sediment control items and landscaping items on the plan sheets. Some items may need to be deleted.
- Design file: 5, 25, 26, 29, 30, 33, 38, 62
- d file 3, 4, 5, 12, 24, 25, 26, 28, 31, 36, 37, 38, 39, 42, 44, 45
- t file 1, 3, 5, 9, 10, 11, 16, 21, 25, 33, 36, 40, 41, 42, 43, 44, 49, 55, 56, 57, 58, 59

Modify Borders of Plan Sheets as needed
Use the sheet and plot borders in the copied file if they are compatible with our plans assembly method.
If they are not compatible (e.g. consultant files or files from other offices) do the following:
- Remove the plot shape used by other offices by deleting.
- Place the "name" cell and scale it if necessary.
- Delete/detach their sheet border and attach the plan sheet border used by Road Design.
    o This may require putting a border file in the project folder if one isn't present.
    o If a new border is added, add the project number to the border file.

Note Sheet Preparation

Download Notes from https://dot.sd.gov/doing-business/engineering/design-services/downloadable-files
for each new project
- Section D – Erosion Control Notes
- Section H – Landscaping Notes

Save to U:\rd\prj\COUNPCN#\documents
Modify Notes to match project design

Refer to sheet D-20 of this manual for more information on printing note sheets to pdf.
Microstation Note File Names:
- NotesSectionD.dgn (Section D – Erosion Control Notes)
- NotesSectionH.dgn (SectionH – Landscaping Notes)

Title Sheet Preparation

Non-Section Method plans do not require a Section D or Section H Title Sheet since there are not any sections. Plans from Bridge Design without any grading design are usually Non-Section Method. Other small projects with an acre or less disturbed may only require notes to be supplied to the Engineer for inclusion in their section.

Do not open files and Save As to rename. This is true for all file types. Doing so may result in changes being made to others' files before remembering to Save As, having to hit undo multiple times, and/or calling the help desk to have the file restored.

Copy and Paste
For Grading Projects, Copy and Paste titleb.dgn in the project folder
For all other projects locate title.dgn using Windows Explorer:
- Surfacing Projects U:\ms\prj\COUNPCN#\
- Region Design Projects U:\regionXX\prj\COUNPCN#
- Bridge Design Projects U:\br\prj\COUNPCN#
- OR contact the Design Engineer for a copy of the title sheet.

Copy and Paste title.dgn from their folder to U:\rd\prj\COUNPCN# folder

Rename
For Erosion and Sediment Control Plans
- Rename titleb - Copy.dgn OR title - Copy.dgn to titled.dgn to follow naming convention.
- Edit the file as needed to include cells for Section D: Erosion and Sediment Control Plans Heading, Index of Sheets, etc. (See Placing Cells on E-3)
- Add the Surfacing Legend cell for surfacing projects

For Landscaping Plans
- Rename titleb - Copy.dgn OR title - Copy.dgn to titleh.dgn to follow naming convention.
- Edit the file as needed to include cells for Section H: Landscaping Plans Heading, Index of Sheets, etc. (See Placing Cells on E-3)

Modify Borders of Title Sheets (as needed, See Modify Borders of Plan Sheets on E-5 for details)
OR Create a new title sheet by following instructions in D - Drafting of this manual.

Printing and Assembling Plans

- Refer to the Supplemental Information – Electronic Plans (How to create a PDF) in this manual on information on how to print all plan sheets including standard plates.
- Refer to the Chapter 18 Plans Assembly in the *Road Design Manual* to see how plans are assembled.